Project Introduction

This proposal is for a flexible navigation system for deep space operations that does not require GPS measurements. The navigation solution is computed using an Unscented Kalman Filter that can accept any combination of range, planet chordwidth, and angle measurements using any ce- lestial object. The UKF employs a full nonlinear dynamical model of the orbit including gravity models and disturbance models. The filter will estimate both states and parameters. The integrated system employs a sensor that uses novel image processing to extract planetary chordwidths. The extra-solar system body sensor will employ band limiting imaging with the band selected to maximize reliable autonomous object identification.

Primary U.S. Work Locations and Key Partners

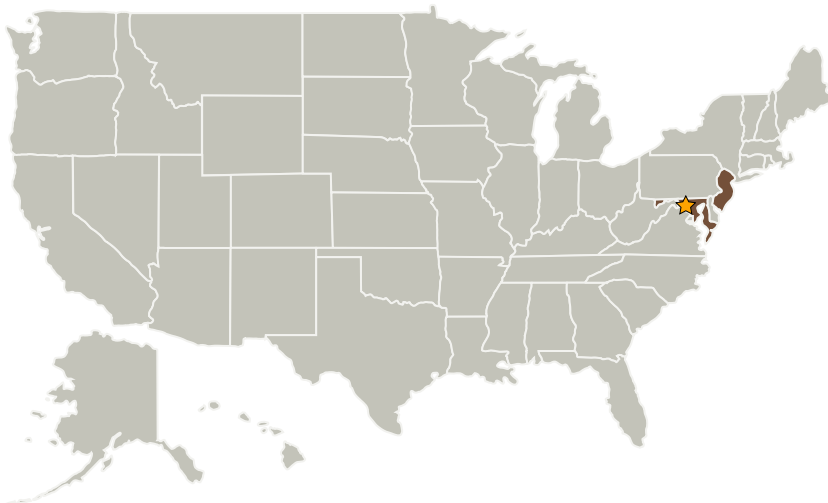| Organizations Performing Work	Role	Type	Location
⭐Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Princeton Satellite Systems	Supporting Organization	Industry	Plainsboro, New Jersey

Optical Navigation System, Phase I

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Primary U.S. Work Locations	
Maryland	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  └ TX17.2 Navigation Technologies
    └ TX17.2.1 Onboard Navigation Algorithms